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The Issue of Renewable Energy as a Subject of Performance Audit – The Case of Romania

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Abstract: The growing importance of renewable energy in Romania's economic and security agenda highlights the need for a systematic evaluation of how public policies perform in practice. This study examines the relevance of performance auditing as a governance tool to ensure accountability and efficiency in the national energy transition process. The research aims to analyse the correlation between the findings of the Romanian Court of Accounts' performance audit on

renewable energy (2017–2022) and the objectives of the Romanian Energy Strategy 2025–2035. The study employs a qualitative analytical-documentary method based on official audit reports, national strategies, and comparative European data. The results reveal significant inconsistencies between strategic planning and policy implementation. The absence of an approved national energy strategy during the audited period led to fragmented decision-making, weak interinstitutional coordination, and inefficient use of public funds. The audit found that the target for expanding renewable capacity was achieved at less than 1% of the planned level, while electricity imports increased by more than 80% between 2019 and 2022. These deficiencies resulted in the loss of energy independence and a sharp rise in household electricity prices, reflecting systemic vulnerabilities in governance and investment management. At the same time, the adoption of the Romanian Energy Strategy 2025–2035 integrates many of the audit’s recommendations, establishing a performance-oriented framework for the transition to low-carbon energy and digital infrastructure. The practical value of this research lies in demonstrating how performance auditing can evolve from a compliance-based exercise into a proactive instrument of strategic management. The findings provide decision-makers with a structured diagnostic of the renewable energy sector and actionable guidance for improving policy coherence, institutional efficiency, and long-term energy resilience.

Keywords: performance audit, renewable energy, energy strategy, public governance, sustainability, energy independence.

Introduction

Renewable energy sources (RES) have, over the past decade, evolved from a “niche” technological alternative into a central pillar of energy security and economic decarbonization. The energy crises of 2021–2023, amplified by the conflict in Ukraine and Europe’s dependence on natural gas imports from the Russian Federation, underscored the strategic nature of investments in renewable energy and smart infrastructure (European Commission, 2022). In this context, the energy transition is no longer merely a climate objective, but a top-tier economic and geopolitical necessity (Herranz-Surrallés, 2024; Yang et al., 2023; Jerzyniak & Herranz-Surrallés, 2024). At the level of the European Union, the new Directive (EU) 2023/2413 on renewable energy (RED III) raised the binding target for 2030 to at least a 42.5% share of RES in final energy consumption, with an aspirational target of 45%, thereby consolidating the role of clean energy in achieving climate neutrality by 2050 (European Commission, 2023a–f). In parallel, the REPowerEU program, adopted in May 2022, established the financial and institutional framework to reduce dependence on imported fossil fuels, estimating additional investments of approximately €210 billion by 2027, primarily aimed at improving energy efficiency, expanding RES, and accelerating electrification and storage (European Commission, 2022). Globally, the International Energy Agency (IEA) confirmed that between 2024 and 2030, renewable energy consumption is expected to grow by about 60%, driven by favourable policies, declining technological costs, and the expansion of electrification (IEA, 2024a–e). The Renewables 2023 report by the same institution notes that renewable capacity expansion will reach an unprecedented pace by 2028. However, progress may be constrained in some regions by lengthy administrative procedures and insufficient transmission networks (IEA, 2024a–e).

Furthermore, according to IRENA (2023), 2022 marked the most significant annual increase in history in newly installed RES capacity—nearly 295 GW—bringing the global share of renewables to around 40% of total electricity generation capacity. European trends confirm these advances. According to the European Electricity Review 2024 by Ember (2024), renewable sources accounted for approximately 44% of the European Union’s total electricity generation in 2023, while fossil fuels fell to a historic low (–19% compared to 2022). For the first time, solar energy surpassed coal-based electricity, and wind energy became Europe’s leading source of electricity. These structural transformations occurred alongside a decline in energy consumption, indicating that energy efficiency and digitalisation are actively contributing to reducing net demand (Ember, 2024). However, the energy crisis also exposed significant vulnerabilities. According to Eurostat data (2023a–c), Romania recorded the highest percentage increase in household electricity prices within the European Union in the second half of 2022 (+112%), followed by the Czech Republic and Denmark. This development reflects a structural dependence on imports and delays in domestic investment in renewable-based generation. Although 2024 saw a stabilisation of prices, levels remain above the pre-crisis average, necessitating coherent policies to protect consumers and diversify domestic energy sources (Reuters, 2024). To better understand the structural trends of the Romanian energy system, Table 1 summarises the evolution of electricity resources between 2017 and 2022, highlighting changes in the energy mix composition and the role of renewable sources in total electricity production.

Table 1

Structure of electricity resources during 2017–2022 (GWh)

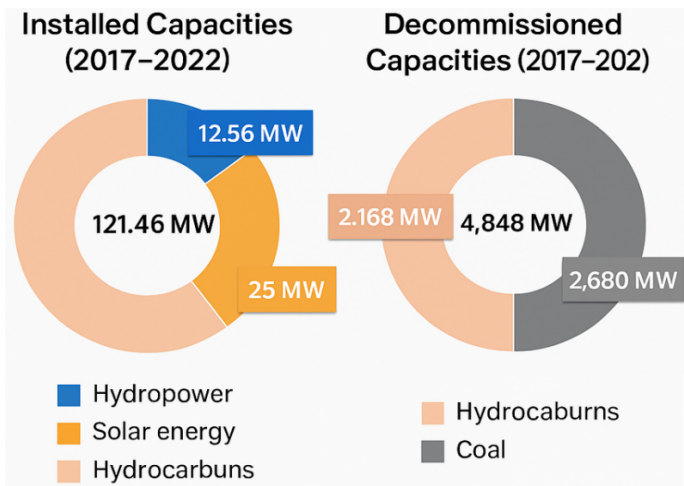
Year	Total production	Hydropower	Wind	Coal
2017	59,473	17,298	6,880	20,356
2018	57,900	16,280	7,134	18,991
2019	58,260	15,940	7,030	17,902
2020	56,370	17,940	6,300	14,755
2021	58,125	17,210	7,820	15,255
2022	55,940	14,730	8,040	13,890

Source: Transelectrica SA, cited in (RCA, 2023).

Based on the data in Table 1, we developed Figure 1, which illustrates the dynamics of installed and decommissioned production capacities during the 2017–2022 period, highlighting the decline of fossil fuel-based units and the slow pace of integrating new renewable sources.

Figure 1

Evolution of installed/decommissioned generation capacities (2017–2022)

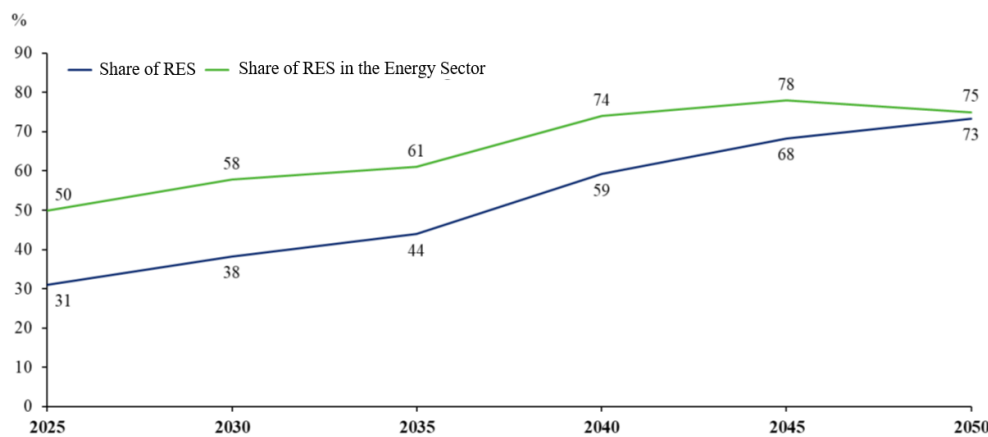


Source: Transelectrica SA, cited in (RCA, 2023).

From a sustainability perspective, the IPCC AR6 Synthesis Report (2023) confirms that achieving the goal of limiting global warming to 1.5°C is only possible through accelerated decarbonization of energy systems, as they account for approximately 75% of total global greenhouse gas emissions. At the same time, measures aimed at increasing the share of RES and improving energy efficiency are identified as the most cost-effective instruments for reducing emissions in the short and medium term (IPCC, 2023). Romania aligns with this framework through the Energy Strategy 2025–2035, the National Integrated Energy and Climate Plan (NECP 2021–2030), and national funding programs such as the NRRP and the Modernisation Fund (Ministry of Energy, 2023). The evolution of the share of renewable sources in gross final energy consumption, according to the targets of the Energy Strategy 2025–2035, is illustrated in Figure 2, showing the progressive increase in the contribution of RES up to 2050 (with targets set at 44% in 2035 and 73% in 2050).

Figure 2

Evolution of the share of renewable energy sources (RES) in gross final energy consumption and in electricity (RES-E)

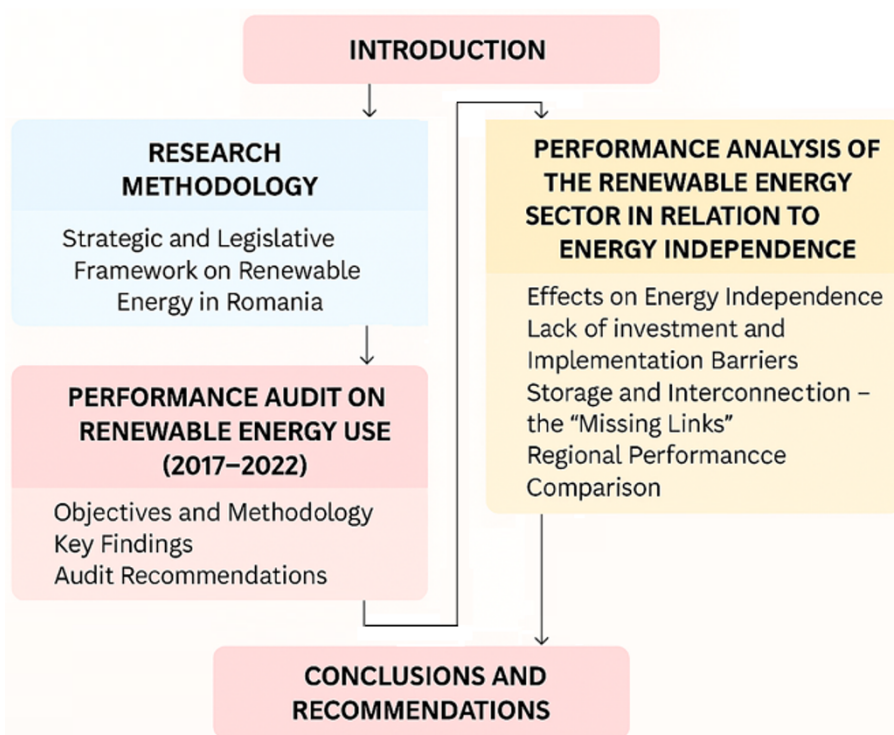


Source: Romanian Energy Strategy 2025–2035, with a 2050 outlook (Updated NECP 2025–2030), (Ministry of Energy, 2023).

However, the performance audit conducted by the Romanian Court of Accounts (RCA, 2023) of the renewable energy sector for the period 2017–2022 highlighted institutional shortcomings and delays in implementing public policies, which negatively affected the achievement of energy independence objectives. In this context, performance auditing becomes an indispensable instrument for energy governance. Unlike financial auditing, it assesses the effectiveness, efficiency, and economy of public policies, thereby contributing to improved decision-making processes and greater institutional accountability (INTOSAI, 2020). The structure of our paper (Figure 3) helps readers understand this important issue more effectively.

Figure 3

Structural design of the paper – stages and thematic interconnections



Source: Developed by the authors.

The performance audit on RES in Romania thus provides not only a diagnosis of deficiencies but also a framework for institutional learning and strategic planning. Aligning the audit’s findings with the objectives of the Energy Strategy 2025–2035 enables the formulation of coherent courses of action focused on sustainable investments, energy security, and transparency in governance. In support of this alignment, Table 2 summarises the main objectives and monitoring indicators established in the Energy Strategy 2025–2035 for the low-carbon energy sector.

Table 2

General Objective 2 - Low-carbon energy: programs, results, and monitoring indicators

Indicator	Target 2035	Source/Remarks
GHG emissions in the energy sector	11.1 million t CO ₂ (-89% vs. 1990)	SO 2.1

Share of RES in gross final energy consumption	44%	SO 2.2
Share of RES in 2050	73%	Energy Strategy, Chapter VI
New installed capacities based on gas and RES	over 8 GW	Modernization Fund, NRRP

Source: Romanian Energy Strategy 2025–2035 (Ministry of Energy, 2023).

In our view, the transition toward a sustainable energy system is inseparable from the state's capacity to monitor, evaluate, and correct public policies. Without strong governance, disciplined implementation, and periodic performance audits, Romania risks turning the green transition into a slow, fragmented, and costly process. Conversely, by strengthening performance auditing as a strategic instrument, the country can ensure a rapid, fair, and efficient transition toward a low-carbon economy.

Research problem

The research problem stems from the discrepancy between Romania's formal commitments to renewable energy development and the limited institutional capacity to implement, monitor, and evaluate such policies. The absence of an approved energy strategy during 2017–2022 and the weak integration of performance auditing mechanisms have hindered progress toward national and European energy goals. This study, therefore, investigates the extent to which performance auditing can enhance accountability, efficiency, and coherence in Romania's energy governance.

Research focus

This research focuses on the intersection of renewable energy policy and public-sector performance auditing in Romania. It examines how the findings of the Romanian Court of Accounts' audit (2017–2022) reflect the efficiency, effectiveness, and economy of national energy governance. Particular attention is given to the correlation between audit results and the strategic objectives set in the Romanian Energy Strategy 2025–2035.

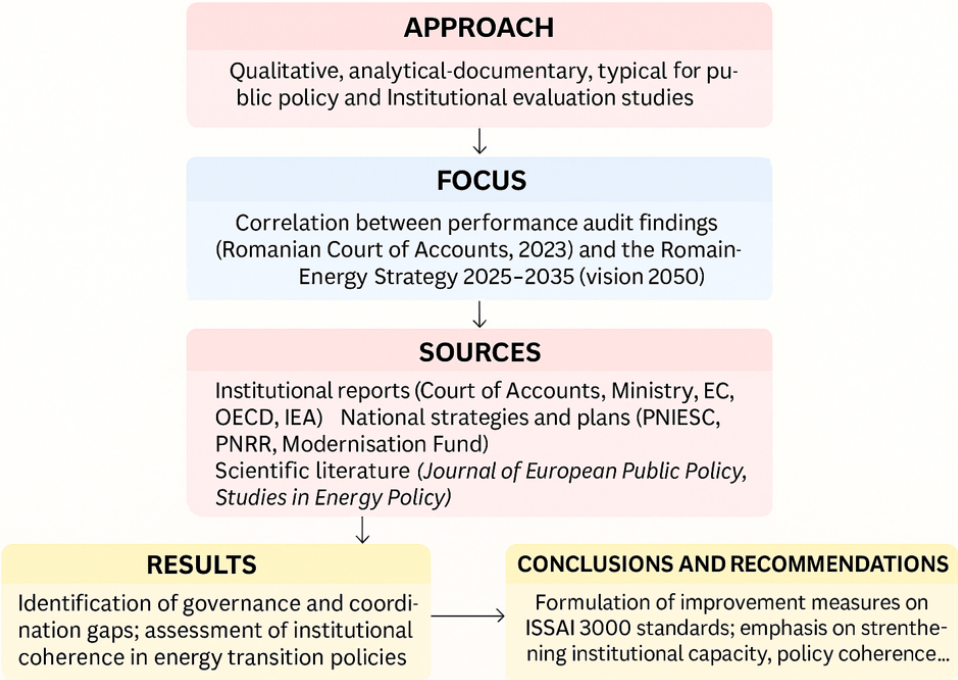
Research aim and Research questions.

The main aim of this research is to analyse how performance auditing can serve as an effective governance instrument for assessing and improving Romania's renewable energy policies. The study seeks to evaluate the coherence between the findings of the Romanian Court of Accounts (RCA) audit for 2017–2022 and the national objectives established in the Romanian Energy Strategy 2025–2035. Based on this aim, the research addresses the following questions: (i) To what extent do the findings of the performance audit align with Romania's strategic goals on renewable energy and energy independence? (ii) What governance and institutional deficiencies have hindered the implementation of renewable energy programs during 2017–2022? (iii) How can performance auditing be used to enhance policy coherence, transparency, and efficiency in the energy transition process?

Research methodology

The paper is grounded in a qualitative, analytical-documentary approach, typical of public policy and institutional evaluation studies. The research was oriented toward correlating the findings of the performance audit conducted by the RCA (2023) with the objectives and measures set out in the Romanian Energy Strategy 2025-2035, with a 2050 outlook, aiming to identify the degree of coherence between institutional assessment and national strategic planning. The analysis was based on a corpus of official documents, public reports, and recent scientific literature selected for their relevance to energy auditing and sustainable governance. In this regard, institutional reports issued by the RCA, the Ministry of Energy, the European Commission, Eurostat, the OECD, and the International Energy Agency (IEA) were examined, along with the main national strategies and plans such as the NECP, NRRP, and the Modernisation Fund. Furthermore, the research was supported by scientific articles published in specialised journals, which offered theoretical and comparative perspectives on the relationship among the energy transition, energy security, and public performance auditing. The methodological approach consisted of conducting a comparative analysis between the results of the performance audit for the period 2017-2022 and the national strategic objectives for the 2025-2035 horizon, followed by a thematic evaluation of the primary dysfunctions identified—such as those related to governance, planning, administrative coordination, and energy independence (Figure 4).

Figure 4
Conceptual framework of the research methodology



Source: Developed by the authors.

At the same time, the study sought to correlate these findings with the specialised literature to identify international trends and best practices in performance auditing applied to the energy sector. On this basis, recommendations were formulated in line with the principles and international

standards for performance auditing (ISSAI 3000 – INTOSAI) to strengthen institutional capacity and improve the strategic decision-making process. The research results are interpreted through the lens of the European framework for energy transition and the principles of good governance, offering an integrated perspective on how Romania can transform performance auditing into an active and predictive instrument for the formulation and evaluation of public policies. To anchor the methodological approach within a concrete strategic framework, the Romanian Energy Strategy 2025–2035 establishes a set of performance and monitoring indicators to track progress in the energy sector. Table 3 presents a representative selection of these indicators, which can serve as benchmarks for performance auditing applied to public energy policies.

Table 3

Performance and monitoring indicators for the objectives of the Energy Strategy 2025–2035

Strategic Objective	Performance Indicator	Target / Year
Energy security	Reduction of import dependence	Below 10% by 2035
Energy efficiency	Reduction of network losses	-20% by 2035
Efficient markets	Increase in competition in domestic markets	Index >0.6 in 2035
Digitalization	Implementation level of SCADA/AI systems	100% in critical infrastructure, 2050

Source: Romanian Energy Strategy 2025–2035 (Ministry of Energy, 2023).

Strategic and legislative framework on renewable Energy in Romania

European context

The European Union (EU) energy policy is of critical importance and has been the subject of extensive observation and analysis by numerous researchers (Skjærseth, 2021; Marhold, 2023; Herranz-Surrallés, 2019). It entered a phase of structural acceleration after 2022, when the gas and electricity crisis transformed the green transition into a matter of economic and geopolitical security. The new regulatory framework combines setting more ambitious targets for RES, market reforms aimed at reducing price volatility and increasing resilience, and a comprehensive package for grids, storage, and cross-border infrastructure. To assess the balance between domestic electricity production and final consumption, Table 4 presents the evolution of these indicators over the period 2017–2022, highlighting the moments when Romania became a net importer of energy.

Table 4

Evolution of electricity production and consumption during 2017–2022

Year	Production (GWh)	Domestic consumption (GWh)	Export-import balance
2017	59,473	57,890	+1,583
2018	57,900	58,700	-800
2019	58,260	59,110	-850
2020	56,370	56,540	-170

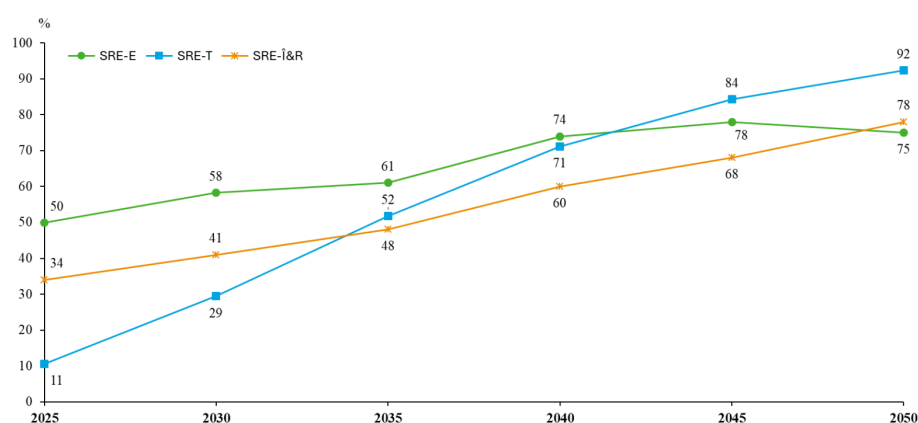
2021	58,125	58,980	-855
2022	55,940	58,650	-2,710

Source: Transelectrica SA, cited in (RCA, 2023).

At the core of this framework lies Directive (EU) 2023/2413 (RED III), which raises the target to at least a 42.5% share of RES in the EU's final energy consumption by 2030, with an aspirational goal of 45%, while also introducing rules to accelerate project authorisation procedures (European Commission, 2023a-f). The sectoral distribution of renewable energy projected for the 2035-2050 horizon, in line with the requirements of the RED III Directive, is presented in Figure 5, highlighting the contributions of different economic sectors to the decarbonization objectives.

Figure 5

Estimated trajectories of the shares of renewable energy in final energy consumption by sector (electricity, heating and cooling, and transport)

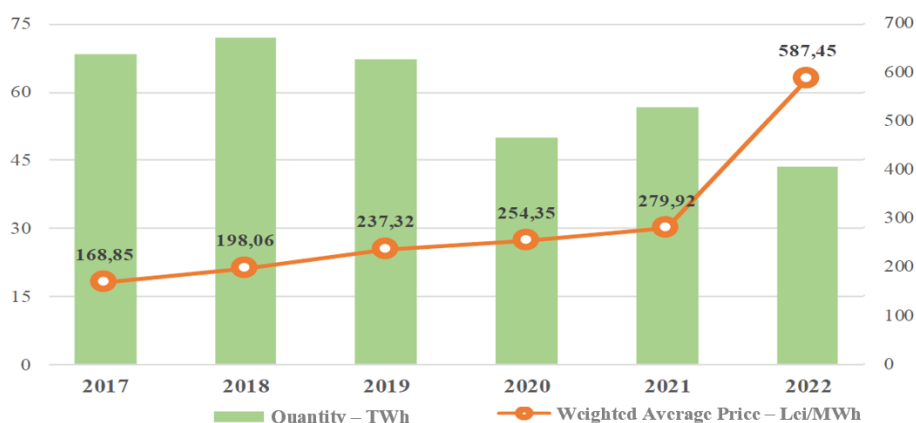


Source: Romanian Energy Strategy 2025-2035 (Ministry of Energy, 2023).

The figure illustrates the sectoral distribution of renewable sources (electricity, heating and cooling, transport), highlighting electrification and decarbonization trends through 2050. Complementarily, REPowerEU (Communication COM(2022)230) provides the strategic and financial framework for rapidly reducing dependence on imported fossil fuels, mobilising additional investments estimated at approximately EUR 210 billion by 2027 for efficiency, electrification, RES development, and critical infrastructures. The document outlines explicit directions for accelerating permitting procedures, increasing domestic production of renewable hydrogen and biomethane, and improving interconnections among regional markets (European Commission, 2022). To transform these targets into stable investment signals, in 2024 the EU adopted reforms to the electricity market design (Directive (EU) 2024/1711 and Regulation (EU) 2024/1747). The reform strengthens the use of long-term contracts (e.g., CfDs for new RES capacities), encourages PPAs (Power Purchase Agreements), and introduces consumer protection mechanisms against price shocks, while also increasing long-term revenue visibility for investors (European Commission, 2024a-c). Recent developments in Romania's electricity market confirm the pressures caused by price volatility. Figure 6 highlights the sharp increase in the weighted average price of electricity traded on forward markets during 2017-2022, correlated with fluctuations in delivered volumes.

Figure 6

Evolution of deliveries and the weighted average price of electricity traded on forward markets (2017–2022)



Source: OPCOM SA, cited in (RCA, 2023).

Figure 6 illustrates the correlation between the volumes of electricity traded on forward markets and the significant increase in weighted average prices, reflecting inflationary pressures and market volatility in Romania's post-pandemic energy sector. Recognizing that grids represent the “missing link” in the transition (due to congestion, slow connections, and local adequacy issues), the European Commission published in November 2023 the Action Plan for Grids – a 14-point package designed to make European networks more robust, digitalized, interconnected, and cyber-resilient, with a focus on modernizing substations, integrating flexibility mechanisms (demand response, aggregation), and streamlining permitting procedures for grid reinforcements (European Commission, 2023a-f). In parallel, the cross-border infrastructure component is addressed through Regulation (EU) 2022/869 – TEN-E (recast), which aligns infrastructure policy with climate targets and expands the range of eligible categories (including smart grids, offshore grids, and hydrogen networks), facilitating the financing of Projects of Common Interest (PCI) and Projects of Mutual Interest (PMI) (European Parliament & Council, 2022). In practice, TEN-E operates in synergy with the Connecting Europe Facility (CEF), which has recently funded transnational offshore wind hubs and energy islands (e.g., Bornholm) (Reuters, 2025), anchoring a regional renewable energy market in the North Sea and the Baltic Sea (European Commission, 2025a-b). Regarding the offshore vector, the EU Strategy on Offshore Renewable Energy (2020) aims for a gradual increase in offshore installed capacity to 60 GW by 2030 and 300 GW by 2050, through hubs, hybrid interconnections, and common technical standards – delivering benefits in terms of levelized costs of energy (LCOE) and regional balancing (European Commission, 2020). This strategy is linked to the medium- and long-term adequacy assessments conducted by ENTSO-E (MAF/ERAA), which evaluate adequacy risks and the need for flexibility and storage in a system with a high share of variable RES (ENTSO-E, 2024). In the internal market, the annual ACER/CEER reports indicate an increasing share of long-term contracts and green PPAs amid the 2022–2023 volatility, but also highlight persistent challenges: grid constraints, lengthy connection procedures, a lack of granular local price signals to stimulate investment in flexibility, and disparities in consumer protection practices across Member States (ACER/CEER, 2024). From an energy security standpoint, system integration and

synchronisation with the continental grid continue (e.g., the Baltic states), marking a decoupling from eastern systems and adding geopolitical resilience to the regional market (Financial Times, 2025). Overall, the European context of the energy transition combines: (i) firm RED III targets and implementation tools through REPowerEU; (ii) market design reform for stability and bankability; (iii) the Grid Action Plan and TEN-E/CEF for infrastructure development; (iv) the offshore strategy and ENTSO-E adequacy assessments; and (v) ACER/CEER monitoring for market convergence. For Romania, this European ecosystem provides policy anchors (targets, standards, and funding) and a concrete window of opportunity to accelerate RES projects (both onshore and offshore), strengthen grids, scale up CfDs and PPAs, and integrate flexibility mechanisms – essential conditions for ensuring that progress in renewable energy translates into energy independence, price stability, and sustainable industrial competitiveness (European Commission, 2023a-f, 2024a-c; European Parliament & Council, 2022; ACER/CEER, 2024).

National context

Romania is currently undergoing a broad energy transition in which the objectives of sustainability, energy independence, and infrastructure modernisation intersect with local economic, institutional, and technological realities (Gavriş & Popescu, 2024; Ciobotea et al., 2024; Niță et al., 2025). During the 2021–2030 period, the national framework was structured through the National Integrated Energy and Climate Plan (NECP) 2021–2030 and a new strategic document – the Romanian Energy Strategy 2025–2035, with a 2050 outlook – adopted 17 years after the previous major strategic framework.

National objectives and strategic commitments

According to Romania's NECP, several targets have been proposed for 2030 regarding the share of renewable energy in gross final energy consumption, energy efficiency, and reductions in greenhouse gas emissions (European Commission, 2019). In previous policy documents, Romania set a target of around 30.7% for RES by 2030. However, this level remains below the European Commission's (2025b) recommendations for Member States (approximately 34–41%), raising questions about the ambition and feasibility of the Romanian plan. More recently, in the Romanian Energy Strategy 2025–2035, the country has adopted a more ambitious mix, aiming for a faster transition toward electrification, an increase in wind and solar capacities, and an intensive exploration of offshore potential in the Black Sea (with an estimated potential of about 76 GW) (Ministry of Energy, 2023; Renewable Market Watch, 2024).

Capacities, support policies, and market mechanisms

Romania already possesses significant RES – hydro, wind, and photovoltaic – yet the current growth rate is considered insufficient to meet the stated objectives (StrategicaEnergy.eu, 2024). A study dedicated to the RES sector indicates that, by 2030, the additional capacity required could be substantial under both realistic and most ambitious scenarios (Renewable Market Watch, 2024). In terms of grid connection and energy storage, the challenges remain significant. For example, Romania plans to install around 2,000 MW of storage systems by 2030 to manage RES intermittency (Strategic Energy, 2024). Likewise, the new regulation on grid connections (ANRE Order No. 20/2025) aims to prioritise mature projects and reduce speculative applications, thereby recognising

administrative and technical bottlenecks (Strategic Energy, 2025). Romanian authorities have introduced (or are in the process of introducing) mechanisms such as Contracts for Difference (CfD) schemes to stimulate investments in RES, signalling stronger alignment with Western European models (CEE Legal Matters, 2024).

Regarding legislative and investment frameworks, Romania has implemented a complex legal system that is gradually harmonised with EU law, including support mechanisms for green energy producers and the green certificates market (Global Legal Insights, 2024). At the same time, emphasis is placed on reforming the energy market, removing barriers for prosumers, and promoting energy communities (ICLG Business Reports, 2024). Romania continues to face challenges related to the import of energy and fossil fuels, which amplifies the importance of RES within its energy security strategy. The Romanian Energy Strategy 2025-2035 highlights this through its national objectives of “diversifying energy sources” and “ensuring supply stability,” which include integration with European grids, harnessing offshore potential, and expanding nuclear capacities (particularly through small modular reactors) (Ministry of Energy, 2023; En-gmr.mapn.ro, 2024). Another key pillar of the transition is the rapid expansion of photovoltaic capacity, as confirmed by recent data showing an exponential increase in investment and the number of prosumers (Renewables Now, 2025). On the financial front, Romania is actively leveraging European and multilateral instruments for climate finance and green infrastructure development. In this regard, the World Bank has highlighted the use of green funds to support Romania’s national energy transition priorities (World Bank, 2024a-b). According to a recent analysis, Romania aims to reach an initial offshore capacity threshold of 3 GW by 2035 (Balkan Green Energy News, 2025).

Criticisms, dysfunctions, and gaps

Several environmental organisations and think tanks consider that Romania’s national strategy and plan are suboptimal in terms of RES ambition and decarbonization planning. For example, one report indicates that Romania rejected the European Commission’s recommendation to raise the RES target to 41%, setting instead a 2030 target of only 38.3% (Balkan Green Energy News, 2025; Bankwatch, 2024). Moreover, a gap analysis of NECPs identified that Romania, along with other countries, risks failing to meet its targets unless structural measures are accelerated (Climate Observatory, 2024). The implementation of renewable energy policies in Romania is affected by factors such as delays in approving strategies, a complex institutional framework, a lack of investor predictability, and the slow allocation of European funds. According to IEA materials (2024a-e), Romania needs to strengthen the governance of its energy system, particularly in the RES sector. From a performance audit perspective, the national context presents a wide spectrum of intervention points: assessing whether strategies were adopted promptly, whether support mechanisms proved effective, whether infrastructure has adapted, and whether investors enjoyed sufficient predictability – all of which constitute essential criteria for efficiency, effectiveness, and economy (cost-effectiveness) in the RES sector.

Performance audit on the use of RES (2017-2022)

Objectives and methodology of the audit

The performance audit on the use of RES in Romania, conducted by the RCA in collaboration with the Netherlands Court of Audit (NCA), represented one of the most significant public evaluation missions in the energy sector in recent years. The mission, carried out between January 2021 and December 2022, had a comparative, transnational character and was part of the European initiative EUROSAI WGEA – Working Group on Environmental Auditing (EUROSAI, 2023). The methodology followed the international standards for performance auditing – ISSAI 3000 and ISSAI 3100 (INTOSAI, 2020) – which involved: (a) establishing performance criteria (efficiency, effectiveness, economy); (b) using primary and secondary data (from the Ministry of Energy, ANRE, Transelectrica, and Eurostat); (c) conducting interviews and comparative analyses among participating states; and (d) triangulating results with the European Union's energy policy objectives. The main specific objectives of the mission were (RCA, 2023): (i) to assess the extent to which Romania has ensured its energy independence through the use of RES; (ii) to analyze the dynamics of electricity prices in the context of the energy transition; and (iii) to examine the efficiency of investments and support programs aimed at developing renewable energy production capacities. The audit also sought to correlate sectoral performance with the progress reported under the National Integrated Energy and Climate Plan (NECP 2021-2030) – the key reference document for energy governance and decarbonization (European Commission, 2023a-f). In methodological terms, the audit used key performance indicators such as: the share of RES in total energy production, the implementation rate of investment programs, the level of net energy imports, and the evolution of consumer costs, accompanied by comparisons with the EU average and neighbouring countries (Bulgaria, Hungary, Poland, Greece). Thus, the evaluation was not merely a static assessment but a relative efficiency analysis aimed at determining Romania's positioning within the broader European energy transition.

Main findings

The analysis of the Performance Audit on the Use of RES in Romania (RCA, 2023) highlights a series of structural dysfunctions and implementation deficiencies that have affected the country's performance in harnessing renewable sources. First, the absence of an approved energy strategy during 2017-2022 created a strategic vacuum. Romania lacked an officially adopted energy strategy through a normative act, which led to fragmented decision-making, overlapping institutional competences, and delays in accessing European funds, particularly from the Modernisation Fund and the REPowerEU programs (RCA, 2023). As a result, numerous investment projects were carried out without a coherent prioritisation framework, reducing the efficiency of public resource allocation (OECD, 2023a-c). Second, the objectives related to increasing installed renewable capacities were not met. According to the NECP, Romania had set a target to expand its installed renewable energy capacity by 1,816 MW by 2022, yet the actual achievement rate was only 0.64% (RCA, 2023). This stagnation was driven by delays in licensing, grid connection bottlenecks, and legislative uncertainties that discouraged investors (RWEA, 2023a-b).

A recent report by the Renewable Energy Policy Network for the 21st Century (REN21, 2024) confirms that Romania ranked among the lowest EU Member States in the pace of adding new RES

capacity between 2019 and 2022. Another significant aspect is the decline in energy production and the growing dependence on imports. Between 2017 and 2022, domestic electricity production decreased by 12.44%, while internal consumption remained relatively stable. This imbalance turned Romania from a net exporter into a net importer of electricity starting in 2019, resulting in a cumulative trade deficit of €735.8 million between 2019 and 2021 (Eurostat, 2023a-c). This structural shift runs counter to energy security objectives and reveals vulnerabilities in energy transition planning (World Bank, 2024). At the same time, rising energy prices and the associated socio-economic effects had a major impact. In the second half of 2022, Romania recorded the highest percentage increase in household electricity prices in the European Union (+112.35% compared with the same period of the previous year), according to Eurostat (2023a-c). This development, exacerbated by wholesale market volatility and import dependence, affected economic competitiveness and deepened social vulnerability. The insufficient domestic renewable capacity increased consumers' exposure to market shocks. The audit also revealed delays and poor coordination in implementing support programs. Funding initiatives such as Electric UP, the Modernisation Fund, and the green component of the NRRP were hindered by staff shortages, cumbersome administrative processes, and outdated legislation governing project selection. Moreover, the audit identified risks of losing EU funds due to delays in project completion (RCA, 2023). Finally, a critical weakness identified was the lack of a coherent monitoring and evaluation system. The institutions involved – the Ministry of Energy, ANRE, and the Ministry of Environment – lack a unified framework for monitoring performance indicators related to RES policy implementation. The absence of an integrated data collection and analysis system makes it difficult to assess progress and the impact of public programs (INTOSAI, 2020).

Audit recommendations

Based on its findings, the RCA formulated a set of strategic recommendations to strengthen good public governance and performance management. It proposed developing a national program to expand energy storage capacity, intended to enhance the flexibility of the National Energy System and facilitate the efficient integration of renewable sources. At the same time, the audit emphasised the need to prioritise public investments in energy infrastructure and to accelerate the approval of mature projects, alongside the gradual replacement of conventional coal- and gas-based capacities with renewable sources, including through the use of Contracts for Difference (CfD) mechanisms. The Court also recommended improving monitoring and reporting mechanisms for implementing the National Integrated Energy and Climate Plan (NECP) and periodically updating the National Energy Strategy to reflect sectoral developments. Additionally, it called for the creation of a permanent interinstitutional cooperation framework between the Ministry of Energy, ANRE, and the Ministry of Environment to ensure coherent management of data and processes related to the energy transition. Finally, the audit underscored the importance of developing professional competencies among staff in public institutions responsible for drafting and overseeing renewable energy policies (RCA, 2023; OECD, 2023a-c). Implementing these recommendations is essential to transforming performance auditing into a proactive tool for administrative reform – one that enhances transparency, efficiency, and the state's strategic capacity.

Performance analysis of the RES sector in relation to energy independence

Romania possesses remarkable natural potential for producing energy from renewable sources (RES) – solar, wind, hydro, and, to a significant extent, biomass. According to data from the International Renewable Energy Agency (IRENA, 2024), the country benefits from solar radiation levels exceeding 1,300–1,600 kWh/m²/year in southern and southeastern regions, average wind speeds of 6–8 m/s on the Dobrogea Plateau, and an installed hydropower capacity of over 6,300 MW. These features position Romania among the most promising emerging economies in Central and Eastern Europe in terms of energy transition potential. However, the actual performance of the RES sector during 2017–2022 fell short of expectations, as highlighted by the RCA (2023). The total installed capacity in RES production units decreased by 0.96%.

In comparison, conventional capacities (coal and natural gas) declined by 44.8%, largely due to the decommissioning of outdated plants and the lack of substitution through new renewable investments. This situation reflects a strategic inconsistency, as other countries in the region – such as Poland, Greece, Hungary, and Bulgaria – significantly accelerated their renewable energy transitions over the same period. For example, Poland increased its photovoltaic capacity by over 9,000 MW between 2019 and 2023 (IEA, 2024a–e); Greece surpassed 50% renewable energy in its electricity mix in 2023 (Ember, 2024); and Hungary expanded its solar capacity from 700 MW in 2019 to more than 5,000 MW in 2024 (SolarPower Europe, 2024). By comparison, Romania stagnated, adding less than 200 MW of new RES capacity in the same period (RWEA, 2023a–b). This stagnation is primarily attributed to legislative unpredictability, administrative bureaucracy, and the absence of stable financial mechanisms such as Contracts for Difference (CfD) or public-private partnerships.

Effects on energy independence

According to Eurostat data (2023a–c), Romania became a net importer of electricity in 2019, a trend that continued through 2022, with import volumes increasing by over 85%. In 2021, Romania's overall energy dependence reached 21.2%, compared to the EU average of 55%; however, the trend is upward, contrary to the objectives set out in the National Energy Strategy 2025–2035 (Ministry of Energy, 2023). The energy trade deficit amounted to €735.8 million during the period 2019–2021 – an alarming indicator for a country that previously maintained a production surplus. This structural reversal of the energy trade balance was associated not only with declining production but also with the interruption of modernisation programs for hydro and thermal capacities, as well as delays in developing interconnection projects (Transelectrica, 2023).

Lack of investments and implementation bottlenecks

During the audited period, Romania lost its previous steady pace of investment in the renewables sector. The annual rate of new capacity additions was below 1%, whereas the period 2010–2015 had seen an expansion of over 5,000 MW in just five years (REN21, 2024). The main causes identified include: (i) the repeal of the green certificate support scheme (after 2016) without the introduction of a functional alternative; (ii) the complexity of authorization procedures, with permit acquisition taking up to 24 months (CEE Legal Matters, 2024); (iii) insufficient administrative capacity for project evaluation and the absence of a national storage plan (World Bank, 2024); and (iv) the under-dimensioning of transmission and distribution networks, with over 200 grid connection

requests pending at the end of 2022 (ANRE, 2023). As a result, the lack of investment weakened energy independence and reduced the system's resilience to external shocks. In the absence of rapid RES expansion, Romania relied on electricity imports from Hungary and Bulgaria during peak consumption periods, thereby increasing price volatility and undermining industrial competitiveness.

Storage and interconnection - the “missing links” of the system

The performance audit emphasised that the lack of storage capacity and delays in interconnection projects are the main vulnerability factors of the National Power System (SEN). Projects such as Tarnița-Lăpușești (pumped-storage hydropower plant) and the Islaz accumulation plant have remained in an incipient stage for more than a decade. At the same time, the integration of cross-border networks – particularly with the Republic of Moldova, Serbia, and Hungary – has progressed slowly, despite being financed through the Connecting Europe Facility (CEF) and the Modernisation Fund (European Commission, 2023a-f). According to Transelectrica (2023), Romania's transmission network requires investments exceeding €2 billion by 2030 for modernisation and digitalisation, without which the integration of renewable projects will remain limited. Furthermore, Romania needs additional storage capacity of at least 2,000 MW to balance the seasonal and hourly variations in RES production (Strategic Energy, 2024).

Regional performance comparison

Compared to other Central and Eastern European economies, Romania occupies an intermediate position, with a moderate level of RES penetration (around 25% in 2022) and a stagnating trend, according to the IEA (2024a-e). Poland has reached over 35% RES, Greece over 50%, Hungary 32%, and Bulgaria 30% (Ember, 2024). Therefore, despite its abundant resources, Romania has yet to harness its available potential fully. This discrepancy has direct implications for energy independence, which is defined not only by domestic production but also by the capacity to balance, store, and interconnect. Without these elements, an increase in the share of RES may actually exacerbate system vulnerabilities (REN21, 2024). In our view, the analysis of the RES sector's performance shows that Romania stands at a critical point in its energy transition. While technical potential is high, institutional and investment performance remain insufficient to achieve true energy independence. Strengthening the grid, diversifying financing mechanisms (including CfDs and green PPAs), accelerating grid connections, and developing storage capacities are sine qua non conditions for transforming renewable resources into genuine national energy independence and resilience.

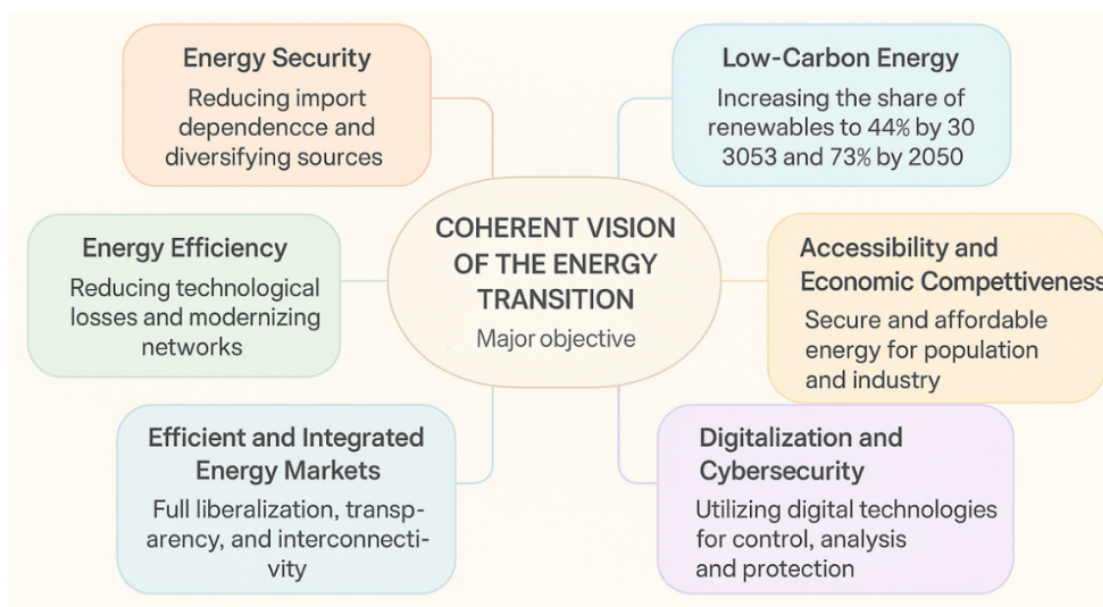
Correlation of the audit findings with the Romanian Energy Strategy 2025-2035

The relationship between the performance audit results and the Romanian Energy Strategy 2025-2035 reflects the extent to which the Romanian state has integrated institutional feedback into the planning process for the energy transition. The analysis of this correlation highlights not only the administrative response to the deficiencies identified but also the growing maturity of the national energy governance framework, now oriented toward performance and sustainability. Published at the end of 2023, the Romanian Energy Strategy 2025-2035, with a 2050 outlook, represents the most comprehensive strategic planning document in the energy sector since 2007. It was explicitly

designed as a response to the deficiencies identified by the RCA (2023) and as an instrument to align national policy with the European Union’s new objectives on decarbonization, resilience, and the digitalisation of energy systems. The document provides a coherent vision of the energy transition, structured around six major strategic objectives, as illustrated in Figure 7.

Figure 7

Objectives of the Romanian Energy Strategy 2025–2035, with a 2050 outlook



Source: Developed by the authors based on (Ministry of Energy, 2023).

Through its projected directions, the strategy aims to balance the threefold dimension of energy policy – security, sustainability, and affordability – in a manner consistent with the European Green Deal and the REPowerEU plans (European Commission, 2023a–f; Ember, 2024).

Energy security

The first strategic objective focuses on reducing Romania’s vulnerability to external shocks and strengthening the national energy supply chain. The strategy builds on the RCA (2023) findings regarding the country’s growing dependence on imports and responds through a set of concrete measures: (i) diversifying supply sources by expanding domestic production and ensuring active participation in regional interconnections (ENTSO-E, BRUA, Black Sea Energy Corridor); (ii) increasing storage capacities (electrochemical, hydro, and green hydrogen-based) to balance the seasonal variability of RES; and (iii) modernizing critical infrastructure (transformation stations, high-voltage lines, and digitalized control centers). A key objective for the 2025–2035 period is to reverse the energy balance so that Romania once again becomes a net exporter of electricity by 2035 and contributes actively to the integration of the Republic of Moldova’s energy market (Ministry of Energy, 2023; World Bank, 2024). Furthermore, through investments financed by the Modernisation Fund and the Connecting Europe Facility, the strategy aims to reduce technological losses and enhance system resilience against cyber or geopolitical incidents (European Commission, 2024a–c). Thus, energy security is understood not merely as a matter of production capacity but as a cornerstone of national and regional security.

Low-carbon energy

The second strategic pillar of the document reflects Romania's commitments under the Paris Agreement and the European Green Deal. The target of reducing greenhouse gas emissions by 87% by 2035 (compared to 1990 levels) is among the most ambitious in Central and Eastern Europe (IEA, 2024a-e). The strategy calls for an accelerated expansion of renewable capacities—particularly wind and photovoltaic—by adding at least 10 GW by 2035, supported through Contracts for Difference (CfD) and Power Purchase Agreements (PPA) mechanisms (RWEA, 2023a-b; Ember, 2024). In addition, Romania plans to develop: (i) green hydrogen production based on solar and wind energy; (ii) Small Modular Reactors (SMR) at Cernavodă, in partnership with U.S. and Canadian counterparts (DOE/Department of Energy, 2023); and (iii) industrial reconversion programs for coal-dependent regions as part of the Just Transition Mechanism (European Commission, 2023a-f). Through these measures, Romania seeks not only to decarbonise its energy system but also to create a new domestic green industry grounded in innovation and technology transfer. The target of achieving a 73% RES share in the electricity mix by 2050 positions the country in convergence with EU standards, though success will depend on the continuity of public investments and regulatory stability (REN21, 2024).

Energy efficiency and public governance

Another key lesson from the performance audit is the need for coherent, accountable energy governance. In the new strategy, an integrated monitoring and reporting system is proposed—connected to the National Integrated Energy and Climate Plan (NECP) and the National Clean Energy Action Plan—that will enable continuous evaluation of progress and real-time policy adjustments (Ministry of Energy, 2023). Among the priorities set are: (i) the digitalization of electricity networks, including the installation of smart meters for at least 80% of consumers by 2030; (ii) increased transparency of public investments through the publication of performance indicators and unit costs; (iii) professional training for personnel in public institutions involved in energy policy implementation; and (iv) integration of performance auditing into the budgetary planning cycle to ensure efficient use of public funds. These measures directly address the Romanian RCA's criticism regarding fragmented competences and the absence of a unified evaluation framework. The implementation of an Energy Governance Scoreboard would, according to OECD recommendations (2023a-c), enable better coordination among institutions and transparent monitoring of results. From a forward-looking perspective, we consider that, through its design, the 2023 Energy Strategy marks a paradigm shift—from a predominantly reactive approach to an anticipatory, performance-oriented one. The document integrates performance auditing as an institutional feedback tool. It establishes a solid foundation for long-term energy governance, in which decarbonization, security, and digitalisation become complementary pillars of economic competitiveness.

Identified dysfunctions and lessons learned: The need for continuous and impact-oriented auditing

The comparative analysis of the performance audit findings (2017-2022) and the measures outlined in the Romanian Energy Strategy 2025-2035 provides a coherent picture of institutional

transformations in the energy sector. While the audit highlighted systemic deficiencies, fragmented decision-making, and delays in program implementation, the new strategy aims to establish an integrated framework focused on performance and sustainability. The confrontation of these two perspectives yields valuable lessons, highly relevant to future public policy design and energy governance.

Deficient governance and strategic discontinuity

The first major lesson stems from the findings of deficient governance during the 2017–2022 period. The absence of an approved and updated energy strategy led to a disconnect between national policies and European objectives, undermining the coherence of administrative decisions (RCA, 2023). In the absence of a validated strategic document, institutions operated reactively, with fragmented interventions and no clearly defined priorities. The consequences were evident in the lack of interinstitutional coordination, overlapping competences among the Ministry of Energy, ANRE, and other authorities, as well as the absence of mechanisms for evaluating the performance of public policies (OECD, 2023a–c). The new strategy partially addresses these shortcomings by establishing a unified energy governance framework, with objectives, timelines, and performance indicators aligned with the National Integrated Energy and Climate Plan (NECP 2021–2030). Thus, the fundamental lesson is that strategic stability and institutional coherence constitute sine qua non conditions for the adequate performance of public policies.

Insufficient planning and coordination amid administrative delays and limited institutional capacity

The audit revealed that energy investment planning was carried out without a system for prioritising and monitoring results. During the audited period, Romania lacked an integrated energy project management mechanism, and investment selection was often opportunistic, without proper socio-economic impact assessment (RCA, 2023). Moreover, the absence of a predictable auction calendar for renewable energy projects generated reluctance among private investors (IEA, 2024a–e). According to a World Bank report (2024a–b), fewer than 40% of projects eligible for financing through the Modernisation Fund had actually been contracted by the end of 2022, due to administrative delays and a shortage of qualified technical staff. In response, the Romanian Energy Strategy 2025–2035 establishes a National Mechanism for Energy Project Coordination (MNCP) to ensure synergy between European funding sources and domestic public budgets, as well as a monitoring unit to track investment progress under the authority of the Ministry of Energy (2023). The lesson derived is that data-driven planning and interinstitutional coordination are preconditions for the efficient use of public and private funds. Another critical issue highlighted by the audit is excessive bureaucracy, which delayed or blocked the implementation of support programs (Electric UP, NRRP, Modernisation Fund). The average approval time for a RES project exceeded two years, leading to the loss of funding opportunities (RWEA, 2023a–b). In addition, the lack of digitalisation in administrative procedures and reliance on physical documentation further increased processing times (European Commission, 2023a–f).

Through the new strategy, the government aims to reform energy administration by fully digitalising authorisation processes and introducing electronic platforms for project monitoring. The

main lesson is that administrative efficiency acts as a catalyst for the energy transition, while delays in administrative reform can neutralise the benefits of technical investment.

Economic and geopolitical volatility

The period analysed (2017–2022) was marked by a significant increase in energy prices, driven by geopolitical factors (the war in Ukraine, Europe's dependence on Russian gas) and by internal imbalances between demand and supply. Romania, lacking sufficient RES production capacity and strategic reserves, faced the highest percentage increase in electricity prices in the EU in the second half of 2022 (+112.35%) (Eurostat, 2023a–c). This volatility exposed the structural vulnerability of Romania's energy system, which remains dependent on imports during peak demand periods. The 2023 strategy addresses these risks through measures aimed at diversifying energy sources, investing in storage and regional interconnection, and adopting an integrated vision of energy resilience aligned with the European REPowerEU policies (European Commission, 2024a–c). The essential lesson is that energy resilience is not built solely through production but through market integration, flexibility, and storage. Energy governance must anticipate crises – not merely react to them.

The need for continuous and impact-oriented auditing

The final lesson derives from the very nature of performance auditing. It should not be regarded merely as a compliance exercise but as a recurrent instrument of institutional learning and public policy improvement (INTOSAI, 2020). For a sector undergoing profound transformation, such as energy, continuous monitoring of program efficiency, investment impact, and progress toward strategic objectives is essential. The RCA (2023) recommends that performance auditing be periodic, thematic, and forward-looking, assessing not only legality but also the economic, social, and environmental impact of public policies. This approach, consistent with INTOSAI and OECD standards, transforms auditing into a mechanism of adaptive governance, where feedback becomes an integral component of the decision-making process. The correlation between past deficiencies and current strategic directions shows that Romania is entering a stage of institutional maturity in the energy domain. The lessons learned from the audit and incorporated into the 2023 Energy Strategy outline a governance model in which strategic planning, administrative efficiency, and continuous auditing are interdependent, creating the foundation for a sustainable and competitive energy transition.

Conclusions and recommendations

In the authors' view, the performance audit on the use of RES represents a crucial benchmark for evaluating the quality of public governance in Romania's energy sector. In a context shaped by successive energy crises, the pressure of decarbonization, and geopolitical instability, this type of audit provides an objective assessment of the efficiency, effectiveness, and economy of public policies, as well as of the state's capacity to maintain energy independence. The RCA (2023) findings for the period 2017–2022 outline a clear picture of systemic vulnerabilities: insufficient investment, administrative bureaucracy, limited storage capacity, and a persistent gap between strategic objectives and achieved results. These dysfunctions have led to the loss of energy independence, increasing reliance on imports, and pronounced price volatility, all of which have undermined

economic stability and national security. At the same time, the Romanian Energy Strategy 2025–2035, with a 2050 perspective, marks a paradigm shift in energy governance. The document not only acknowledges the deficiencies identified by the audit but also introduces an institutional architecture grounded on strategic planning, digitalisation, and continuous performance monitoring. However, the success of this strategy depends not only on the quality of its design but also on public institutions' capacity to implement concrete measures, foster interinstitutional cooperation, and maintain a coherent, predictable, and transparent regulatory environment. Performance auditing has thus evolved into a mechanism for institutional learning, surpassing the traditional role of financial auditing focused on compliance and legality. Unlike compliance audits, performance audits assess the real impact of public policies and the efficiency of resource use. In Romania's case, this approach has enabled the identification of structural weaknesses that could not have been captured through conventional legality controls, transforming auditing into a strategic feedback tool embedded within governance and administrative reform processes. The systemic deficiencies identified by the audit call for continuity and structural reform. The absence of an official energy strategy during 2017–2022 led to institutional fragmentation and inefficient decision-making. Although the new strategy addresses these shortcomings, a functional reform of the governance architecture remains necessary—through clearer institutional mandates, reduced bureaucracy, and integrated digital processes that strengthen coordination and accountability. The authors emphasise that energy independence must be treated as a matter of national security. The loss of Romania's status as a net energy exporter and the growing dependence on imports reflect not only an economic weakness but also a strategic vulnerability. In a volatile geopolitical environment, energy security requires diversified sources, strategic storage capacity, investments in critical infrastructure, and regional cooperation. A robust framework for monitoring and transparency must also support energy policies. The lack of a unified system for data collection and analysis was one of the main deficiencies highlighted by the audit. Establishing an integrated digital platform for real-time reporting and visualisation of progress—accessible to both the public and investors—would enhance trust and institutional accountability. Economic and social sustainability, in turn, depends on coherent governance. The energy transition involves high costs and deep structural shifts; without predictable planning and a stable regulatory framework, there is a risk of fragmented investments and rising social inequalities. Governance must ensure a balance between competitiveness, consumer protection, and environmental objectives. To strengthen governance and enhance the effectiveness of performance auditing, several strategic directions are proposed: The RCA should reinforce its role as an independent evaluator of energy policy efficiency by developing modern impact-assessment methodologies. Annual progress reports on renewable energy objectives should be introduced to enable timely policy adjustments and increase transparency. A permanent interministerial coordination mechanism should be established to align investment, financing, and environmental strategies. Digitalisation of monitoring processes must be accelerated to improve data management and reduce administrative bottlenecks. Regular thematic performance audits—focused on investment efficiency in RES, storage capacity development, and regional integration—should be conducted to promote institutional learning and make auditing a forward-looking governance instrument. Romania today possesses the resources, opportunities, and strategic tools needed to restore its energy independence and become a key regional actor in the green transition. However, the realisation of this potential depends on coherent governance, disciplined

administrative execution, and a strong culture of evaluation and performance auditing. In conclusion, only through genuine institutional cooperation, transparent monitoring, and public accountability can the energy transition become a sustainable, competitive, and equitable process, fully aligned with the European Union's principles and international standards of good governance.

Research limitations

This research is grounded in a documentary analysis of strategic and institutional reports, complemented by the review of articles published in high-impact scientific journals indexed in international databases. However, the absence of recent empirical data and the limited availability of detailed post-2023 statistics may affect the accuracy and generalizability of the conclusions. Furthermore, the exclusive focus on the Romanian case narrows the applicability of the findings to other national contexts.

Suggestions for Future Research

Future studies should explore the empirical dimension of performance auditing in the energy sector through comparative analyses across EU Member States and quantitative evaluations of the impact of renewable energy investments. It would also be valuable to develop models that correlate institutional performance, energy efficiency, and the degree of digitalisation of administrative processes. Another relevant direction is examining how external public auditing can accelerate the energy transition and strengthen good governance.

Author Statement on AI Use

The authors declare that AI-based tools (ChatGPT-5) were employed solely for assistance in language editing, style improvement, translation verification, text refinement, and illustration enhancement, under the full supervision of the authors. The entire content has been thoroughly reviewed and finally approved by all authors of the paper.

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